

14
15
CLAIMS

1. A method for determination of the lubricating oil consumption of an internal combustion engine (2), in which:

- 5 - the lubricating oil whose consumption is to be measured is labeled with a determined quantity of at least one radioactive tracer;
- downstream of the engine (2), the quantity of radioactive tracer(s) present in the gases emerging from the latter is measured;
- 10 - and the lubricating oil consumption of the engine is deduced therefrom;

 this method being one characterized in that the measurement of the quantity of radioactive lubricating oil tracer(s) present in the gases emerging from the engine comprises:

15

- bringing these gases in contact with a trap (7) which can physically retain the radioactive tracer particles;
- 20 - with the aid of a detector (10) sensitive to radiation emitted by the radioactive tracer(s) retained by the trap (7) and placed at a distance therefrom allowing the emitted radiation to be measured, continuously measuring this radiation coming from the
- 25 trap;
- and transmitting the measurements taken by this detector (10) to a programmed computer which can convert these measurements into the lubricating oil consumption rate of the engine.

30 2. The method as claimed in claim 1, characterized in that the trap includes at least one filtration element formed by at least one filtering medium with a porous structure, fixed in metal canning.

AMENDED SHEET

BEST AVAILABLE COPY

15
16

3. The method as claimed in claim 1 or 2, characterized in that the radioactive tracer incorporated into the lubricating oil is a radioactive element with a short half-life, in particular bromine 82 or technetium 99m.
- 5 4. The method as claimed in claim 3, characterized in that the technetium 99m is incorporated into the oil in the form of an aqueous solution of sodium pertechnetate NaTcO_4 .
- 10 5. The method as claimed in claim 1, characterized in that the technetium 99m is incorporated into the oil in the form of particles which have nanometric dimensions and are isolated from the atmosphere by carbon.
- 15 6. The method as claimed in claim 1, characterized in that the radioactive tracer incorporated into the lubricating oil is selected from germanium-68 and/or germanium-69, preferably in the form of at least one tetraalkyl germane containing at least germanium-68 and/or germanium-69.
- 20 7. The method as claimed in claim 1, characterized in that the radioactive tracer is an element, or a compound comprising this element, which has been neutron activated and/or activated by a proton beam before incorporation into this oil.
- 25 8. A device for the continuous determination of the lubricating oil consumption of an internal combustion engine (2), this device comprising: -
- a means for incorporating a determined quantity of at least one radioactive tracer into the lubricating oil;
 - means for measuring downstream of the engine, in the combustion gases emerging from the latter, the
- 30

AMENDED SHEET

BEST AVAILABLE COPY

16
~~17~~

quantity of the radioactive tracer which is present therein;

- and means for deducing the lubricating oil consumption of the engine from this measurement;

5 this device being one which comprises:

 (i) downstream of the engine (2), a trap (7) with which the combustion gases emerging from the engine come in contact and which can physically retain the radioactive tracer particles present in these

10 gases;

 (ii) in proximity to this trap (7) and at a distance therefrom allowing radiation emitted by the radioactive tracer particles retained by this trap to be measured, a detector (10) sensitive to this

15 radiation;

 (iii) functionally linked to the detector (10), a programmed computer (11) which can calculate the lubricating oil or additive consumption of the engine on the basis of the information recorded by the

20 detector.

9. The device as claimed in claim 8, characterized in that the trap (7) includes at least one filtration element formed by at least one filtering medium with a porous structure, fixed in metal canning.

25 10. The device as claimed in claim 8 and 9, characterized in that the trap (7) is placed on the combustion gas exhaust line of the engine (2), or on a branch line intended for this purpose.

11. The device as claimed in any one of claims 8 to

30 10, characterized in that the trap (7) comprises a particle filter.

AMENDED SHEET

BEST AVAILABLE COPY

17
~~18~~

12. The device as claimed in any one of claims 8 to 11, characterized in that the detector (10) is a probe for detection of ionizing radiation.

5 13. The device as claimed in any one of claims 8 to 12, which comprises a filter (9) arranged on the combustion gas exhaust line, between the trap (7) and the point where these gases are discharged to the atmosphere.

AMENDED SHEET

BEST AVAILABLE COPY